

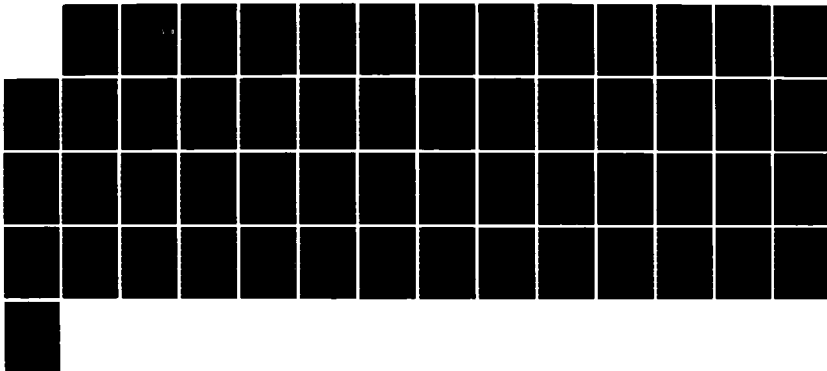
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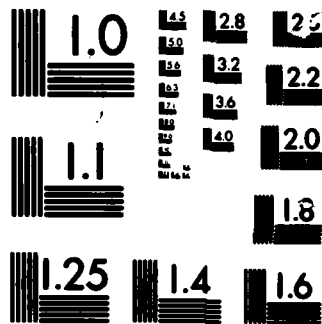
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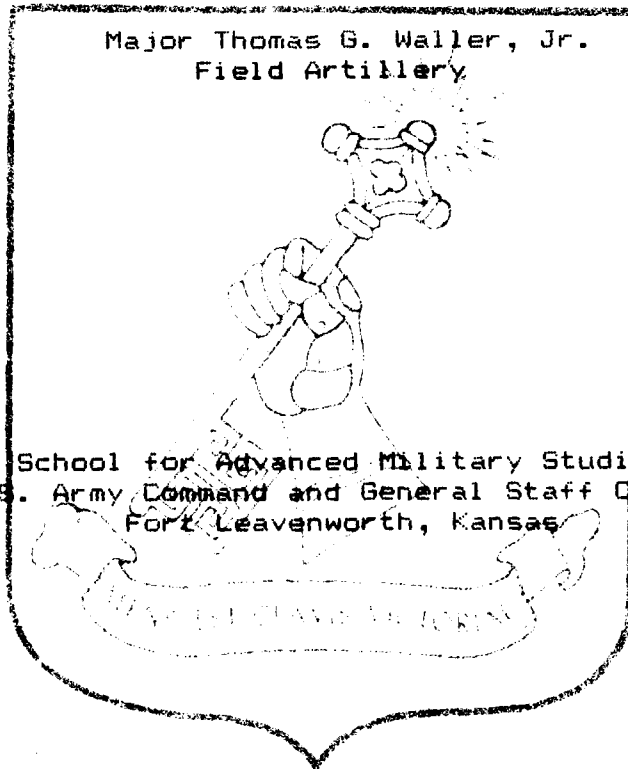
CONTINUOUS THUNDER:

The Challenge of Artillery Support for the Close Battle

By

Major Thomas G. Waller, Jr.  
Field Artillery

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#### ABSTRACT

CONTINUOUS THUNDER: The Challenge of Artillery Support for the Close Battle, by Major Thomas G. Haller, Jr., USA, 46 pages.

This study examines the U.S. Army Field Artillery's current capability to provide close support to maneuver units on the Airland Battlefield. It first analyzes the environment of the modern battlefield and finds that in spite of technological improvements in weapons and command and control capabilities a preponderance of artillery fires will be needed at the small unit level and very close to friendly troops. The whole notion of close support is therefore historically examined in some detail to determine what close support means today and what precise demands it places on the field artillery system. From there the study goes on to examine the field artillery structure in the heavy division to determine its capability to provide the necessary support.

A major conclusion is that if the division battle is to be won, then the priority of fire support effort must be focused on actions that will take place within 300 meters of friendly positions. Close support fires must be immediately responsive to units in contact. They must be closely integrated with all other means of fire support and delivered with finesse and precision as part of the overall scheme of maneuver.

The study also concludes that the current artillery structure is ill-prepared to provide such close support. Field artillery organization, equipment, doctrine, and conceptual thinking leans toward efficiency in target destruction, not toward hedging fire support to maneuver requirements. It appears that within the fire support community the balance between firepower and maneuver is precarious at best.

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By

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## INTRODUCTION

In the annals of war, there has always been a poetic mystique about the volley and thunder of the big guns. Frederick the Great called them "the most-to-be-respected arguments of the rights of kings."1 The great captains of history have relied on artillery to do more than quicken the hearts of timid men. Napoleon reportedly wrote to Prince Eugene, "Great battles are won by artillery."2 No doubt the Emperor spoke in hyperbole to emphasize the great moral and physical effect of hundreds of guns firing in support of the masse de décision. But today's artillery possesses capabilities for massive destruction unprecedented in the history of warfare. Technological developments have provided field artillery systems which enable units to attack enemy formations to unprecedented depth and with devastating lethality. Cannon-launched, laser guided projectiles give the artillery the capability to kill tanks or any armored vehicle with indirect fire. Improved conventional munitions can kill both armored vehicles and personnel with enhanced effectiveness over older, high explosive shells. Artillery units can now seed hasty mine fields with scatterable mine rounds. Terminal-homing munition now under development promise to make artillery not only the greatest killer on the battlefield, but perhaps some day the decisive arm. But for the time being, the U.S. Army's Airland Battle doctrine emphasizes that even if the deep and rear battles are successfully conducted and conditions for overall success created, the close battle will decide the issue:

Close operations carry the primary burden of success or failure. Effective rear and deep operations secure favorable terms for upcoming close operations. They ensure freedom of action and seizure or maintenance of the initiative.<3

An important question, then, is whether or not the field artillery retains the capability to support close operations once the close battle is joined. This paper will consider this question by first looking at the environment of the modern battlefield which will shape the demands placed on the fire support system in general. We will then examine in detail the notion of close support -- what it has meant historically, what it means today, and what demands it places on the field artillery. Finally, we will look at the capabilities of the field artillery to meet these demands. To provide focus to our study, we will restrict our attention to the division battle and the field artillery systems available to support it. Other fire support systems such as mortars, close air support, and attack helicopters will only be addressed as they affect the field artillery's close support mission.

#### THE ENVIRONMENT OF CLOSE SUPPORT

Both U.S. and Soviet theorists agree that the next war will be unprecedented in its scope, lethality, complexity, and swiftness. With today's longer range weapons, enhanced mobility of units, and new capabilities for long-range intelligence and target

acquisition, FM 100-5 portrays a battlefield of much greater breadth and depth than previous wars. Simultaneous deep, close, and rear operations will comprise the total battle at any echelon of command. A conflict in Europe would be characterized by non-linear, highly fluid operations, where sizable units bypass or get bypassed. The highly urbanized terrain of Europe makes combat in built-up areas on a large scale unavoidable. Traditional areas of difficult terrain, particularly mountainous regions such as the Hohe Rhon, the Spessarts, and the Vosges, will take on added significance because they will limit lines of sight of today's longer range weapons, they will restrict movement of today's more mobile vehicles, and they will limit communications and target acquisition. Lethal systems, either improved conventional, nuclear, biological, or chemical will concentrate enormous combat power at decisive points. With the coming of age of the helicopter, units now have the capability to maneuver combat power at high speeds all over the battlefield. Finally, in the highly politicized social environment of Europe, conventional combat will take place amid unconventional warfare and terrorism.<4 All of these developments indicate that the tide of battle could change in minutes, and subordinate units must be prepared to deal with the unexpected and to fight independently at any given time.

Soviet analysts agree with these projections. In fact, they emphasize the speed required in modern war, saying "one minute decides the success of battle, one hour the success of a campaign, and one day the fate of the war." They believe that the meeting

engagement will be characteristic of both small and large unit battles, and they plan to mass enormous amounts of combat power at points of their choosing.<5

What do these environmental characteristics mean to the present-day U.S. heavy division faced with a defensive mission? U.S. divisions in Europe are expected to defend between 40 and 60 kilometers of terrain.<6 NATO policy calls for a forward defense along the inter-German border, which means that if war is imminent or suddenly erupts, units would have to move eastward on roads probably congested by other military traffic and civilian refugees streaming west. Should the Soviets attack, their prime concern will be a lightning defeat of NATO.<7 In fact, their high level of mechanization demonstrates that Soviet forces are designed to fight a mobile, fast-moving battle.<8 U.S. Army doctrine admits that opposing forces will rarely fight across orderly and distinct lines, that linear warfare will be the exception rather than the rule, and that distinctions between forward and rear areas will be difficult. U.S. brigades, therefore, will have their forces spread across some 20 kilometers in a series of hastily prepared battle positions, should they be fortunate enough to get to them before meeting a Warsaw Pact formation.<9 Chances are that the first division battles will be meeting engagements followed by the setting up of a hasty defense. The battle that follows will be extremely violent and complex. A division will probably face a Warsaw Pact combined arms army of 3 to 5 divisions, with at least 2 or 3 of them in the first echelon. Each of these divisions will

be supported by some 17 artillery battalions, with an additional 4 or more battalions providing general support from an army artillery group. This number would include 7 or more battalions of multiple rocket launchers. Close to 100 attack helicopters will range the division battlefield from combined arms army assets.<10

The U.S. division hopes to see this awesome array pared down and dismembered before having to deal with it directly. Corps deep operations aim to destroy the coherence of the combined arms army's attack while inflicting serious losses and delay on its second echelon divisions. Division deep operations should likewise delay, disorganize, and destroy significant elements of second echelon regiments of the the first echelon divisions. If all of these actions go according to plan, the three brigades of the U.S. division will have to face only 4 to 6 enemy regiments in the close battle. Of course, this is a best case analysis. The worst case would face the division in the enemy main attack sector. In that case, 5 to 7 divisions could attack, supported by 45 artillery battalions and 200 attack helicopters, all part of 2 combined arms armies. Twelve first echelon regiments would confront the forward brigades. Behind these lie the spectre of 10 second echelon regiments, and then 2 second echelon divisions, should deep operations fail. If we take somewhat of a middle road, we would likely see a U.S. division facing 8 to 10 regiments in the close battle. As many as 25 artillery battalions would be firing and 150 attack helicopters flying in support of them.<11

U.S. division artillery will fire both to interdict follow-on forces and to suppress enemy air defenses in support of deep operations. It will fire counterfire against the multitude of guns, mortars, and rockets that will no doubt be pounding the forward brigades with preparation fires. As the enemy closes, forward observers will begin calling fires on planned targets and targets of opportunity. Still, the enemy will close on to friendly positions. In contrast to a general feeling that the enemy will be stopped or diverted at extended ranges, General Frederick Kroesen, former commander of U.S. Army Europe, believes otherwise:

We cannot hit what we cannot see, and the 14 hours of darkness in mid-winter, snow, rain, and the many days throughout the year when fog lasts until noon or even all day are limitations that today's weaponry cannot readily overcome. The same is true of our opponents weapons. Those realities and the availability of tactical smoke generating devices in abundance lead me to believe that the next war will be won or lost at the 300 meter range, just as in the past.<9

An intense firefight will therefore follow, as the enemy attempts to overrun or bypass brigade positions. Chances are they will do some of both, and in some areas they will be stopped. In other areas, units will be forced to alternate positions. Meanwhile, as deep operations continue and the close battle swirls, it is possible that a heliborne battalion or larger sized unit will descend in the division rear area. At its height, the division battle will be a maelstrom of combat extending some 60 kilometers from left to right and 80 kilometers from front to rear. By this



time the division commander will certainly have shifted the priority of his fire support to units in contact. What will he expect his field artillery to accomplish?

#### CLOSE SUPPORT TASKS ON THE MODERN BATTLEFIELD

Close support of maneuver forces is the classic role of field artillery. To get a maneuver perspective on close support requirements we should first consult maneuver doctrine. FM 71-100 simplistically identifies the tasks for the fire support system as "close support of maneuver, as well as counterfire, air defense suppression, preparations, and other types of fires."¶13 This sentence tells us that close support is more important than the others, but FM 71-100 as a whole assumes that the term "close support" is self-explanatory. An understanding of the full demands of close support from a maneuver perspective is crucial, however, because, left to his own ideas and experience, an artilleryman's perception may not coincide with maneuver requirements. Let us begin with a definition: Close support fires are those delivered at the request of a maneuver unit to neutralize or destroy an imminent threat to the integrity of that unit. Such fires are "close", because crisis is at hand in both space and time. This definition will do to start, but more than a definition is required if maneuver commanders desire clear effects, such as the screening of a 400 meter open field with smoke, or the suppression of a woodline full of tanks at a range of 50 meters. The field artillery must not only have a specific

picture of the requirements of close support, but also must understand the priorities for various types of fires so that it can have its own training and combat development priorities right in peacetime preparation for war.

Since maneuver doctrine does not convey such an understanding, let us consider field artillery doctrine. FM 6-20 outlines field artillery tasks in the main battle area as follows:

- \* Mass fires to canalize and slow enemy forces and increase engagement times.
- \* Plan fires on obstacles to slow breaching attempts.
- \* Plan fires to isolate enemy front echelons.
- \* Assist maneuver in moving and disengaging.
- \* Plan fires to separate infantry from armor.<14

While these tasks can fit our definition of close support, they do not give a thorough understanding of its details. We need to know where the fires are to be delivered in relation to friendly troops, what effects on the enemy are desired, and what time parameters are necessary for success.

We have discussed the characteristics of the modern battlefield, have set the conditions for the delivery of fire support, and have established a need for more in depth knowledge of the meaning of close support. Let us proceed now toward a perspective on what is needed from close support fires, and how important they are in relation to other types of fires. At this point we are primarily interested in concepts of close support -- the ideas about what it means and how important it is. One could

cite a number of studies on the problem of fire support in general, but perhaps the best source for ideas is military history. Clausewitz insists that because of the nature of the art of war, one needs the experience factor of historical example rather than the pure empirical data of science.<15 For reasons which will be subsequently explained, we will try to develop the requirements for close support by analyzing some examples from World War II, Korea, Vietnam, and the Arab-Israeli War of 1973.

Charles B. MacDonald, former Deputy Chief Historian, U.S. Army, views the Battle of the Bulge as the most decisive battle of the western front in World War II, and the greatest battle ever fought by the U.S. Army. It provides an instructive example for contemporary warfare in that we see a U.S. corps, the VIIIth, with a mission to defend a wide sector, attacked by elements of three panzer armies. While we must be careful not to draw too many lessons from a seeming parallel between what VIII Corps experienced in December of 1944 and what the VII Corps might face in December of 1985, the battle at the tactical level provides many small-scale instances where the forces at work in a tactical action were roughly comparable to what we might see today.<16

The German attack on 16 December 1944 found VIII Corps Artillery badly off-balance. Eight out of nine corps battalions were positioned to support the untried 106th Division. German preparation fires severely damaged U.S. artillery communications nets, and even after they were restored information being passed

was old and useless for targeting. Artillery units fired on enemy locations long since passed, and then were forced to displace away from enemy penetrations. Artillery battalions could provide little close support to the 106th, because many restrictive fire support coordination measures were not updated as the German's advanced past them. Once German units penetrated, many artillery batteries could not displace to favorable positions to provide needed close support. Two to three days would pass before some escaping corps artillery managed to get into the fight again.<17

The 106th was shattered, and the 7th Armored Division moved south from Geilenkirchen on the 17th of December to plug the gap. The division took two routes, with Division Artillery on the eastern most and the two combat commands, A and B, to the west. During the march Division Artillery, which consisted of three 105mm self-propelled and one 155mm self-propelled howitzer battalions, had to dodge a German Kampfgruppe, and arrived at St. Vith a day later than the combat commands. Corps artillery units were still in disarray when divisional battalions took up positions on the afternoon of the 18th.<18 The 434th Armored Field Artillery Battalion had the mission of direct support of Combat Command B, which defended positions due east of St. Vith. On the 18th the 434th fired more than twice as many missions as the other battalions in Divarty, and on the next day received reinforcement from Divarty's 155mm battalion, the 965th, and the surviving 155mm battalion from the 106th, the 275th. This three battalion group was attached to CCB to facilitate close

cooperation with maneuver in an effort at halting the German tide.

The action of CCB defending St. Vith provides a useful historical example, because we see the condition of hastily assumed positions being attacked by superior numbers of tanks and infantry. Further, CCB experienced a very fluid situation. Enemy units appeared unexpectedly from all directions, particularly on CCB's flanks, which were not tied in with other units.<19 At about 1740 hours on Wednesday the 20th, "all hell broke loose." New attacks hit CCB from the north, east, and south. Down the roads and through the woods came tanks and both mounted and dismounted infantry. Assault guns fired direct fire, and artillery fell on U.S. positions.<20 The task force commanders of CCB had foreseen the attack and had set up their own tanks oriented on kill zones, and had planned on-call mortar and artillery fires on the same areas. These arrangements proved highly effective in execution. LTC Richard D. Chappulis, commander of the 48th Armored Infantry Battalion, described it this way:

German tanks often will withdraw when faced by heavy massed artillery. We planned to suck in their armor, stop it with massed artillery, then proceed to KO Jerry tanks at close range with our Shermans.<21

That day the three battalions supporting CCB fired a total of 185 missions, over 4000 rounds, almost all in this type of close support fire. The following day was much the same. The Divarty after-action report stated that the typical action was a massing of tanks in front of friendly positions, which "the field artillery would attack and scatter."<22 The 434th alone fired 81

missions and almost a thousand rounds on the 21st.

The pattern of the 7th Division Artillery support on 20 and 21 December, 1944 is significant. Not just in CCB'S sector, but to the north, to the south, and even in the rear where German armor had broken through from the southern flank, units in contact fought at extremely close range and tasked the artillery to be intimately and immediately responsive to their needs. For this reason, and because communications were haphazard and resupply tenuous at best, direct support artillery units were attached to their supported units. Their fires were almost exclusively close-in fires. Divarty fired no counterfire, even though no corps units were available initially to do so. They fired no counterflak, and no harassing or interdiction fires.<23 This finding shows artillery support of maneuver resembled what a maneuver unit expected. An infantry school text viewed artillery's role this way:

In a defensive situation as in all types of action, the artillery does not play an independent role. Its mission is to prevent the enemy from launching a coordinated attack, and to assist in stopping an attack should one be made.<24

The manual went on to emphasize the absolute priority of close support fires, saying that the artillery "should not be drawn into a contest with enemy artillery."<25 The fact that the U.S. Army artillery of World War II provided this kind of support is an important reason for the praise that was lavished upon the gunners by their maneuver brethren.

The highly fluid combat conditions experienced by the 7th Armored Division on 20 and 21 December 1944 provide a probable precursor to the type of combat our brigades and divisions would experience at the tactical level today. Battalion and brigade-sized units were bypassed and attacked from several directions by superior numbers. Units had to fight semi-independently, and they relied on closely integrated and highly responsive artillery fires to fight the close battle. We can anticipate that on the highly fluid battlefield today, our artillery must respond in a similar fashion. But we still need more details of the precise meaning of "close" in order draw meaningful lessons for the present. When we emphasize the placing of fires directly in front of friendly positions as described above, how close are we talking about? The terrain of the Ardennes and much of Europe did not allow long tank shots in World War II, nor will it today. In fact, even though effective ranges of tank guns have doubled since 1944, the average line of sight in Europe is between 1500 and 2000 meters.<26 World War II tanks could kill effectively at that range, but they took most shots at much closer ranges. A number of FIELD ARTILLERY JOURNAL articles of that period give insights from experience on many of the issues raised here. LTC Frank W. Norris, the commander of the 155mm battalion of the 90th Division Artillery, wrote that

Each unit should be prepared for a drastic revision of its ideas concerning how artillery fire may be placed to its supported troops. They must be prepared to adjust on tanks within 75 yards of OP's, to fire battery volleys within 125 yards of infantry, and battalion

volleys within 200 yards.<27

He went on to say that 8 inch fire was often brought within 200 meters of friendly troops, and 240mm within 250 meters. Not only do we get an idea of how close is close, but we also see that corps heavy battalions often fired in close support as well as division artillery. Thus, even though enemy tanks could be engaged effectively out to 1500 meters, very often they were fired upon by artillery at ranges of 75 yards from friendly positions. With the increased speed and maneuverability of today's armored vehicles and the environmental conditions described by General Kroesen, we can expect the enemy to close well within our longer engagement ranges.

Another significant detail of close support is what types of ammunition are most appropriate. Instructive in this regard is an observer's description of the close support of an infantry regiment's attack on the town of Kaltenhouse. The regiment intended to send two companies abreast over open fields toward the town, and called upon the direct support artillery to lay 400 meters of smoke across the front of the town and suppress enemy strong points with high explosive/fuze time rounds. The Divarty general support 155mm battalion laid smoke to cover a vulnerable flank and to blind enemy artillery OP's as the troops advanced. When the troops closed on the enemy positions, fires were shifted to isolate the enemy from reinforcement and prevent his escape. The U.S. regiment passed in front of an entire enemy company fielding 75mm assault guns and suffered only four wounded. Once



the objective was seized, artillery blocked several counterattack attempts.<28 Interesting in this example is the absolute attention given to close support of the scheme of maneuver by all of division artillery.

We have seen from World War II that in a highly fluid situation where a U.S. unit is defending against superior numbers of tanks and infantry, maneuver units tasked artillery to provide immediate and continuous fires at ranges of from 75 to 300 meters from friendly positions. All divisional artillery units including the general support 155mm battalions fired a preponderance of close support over all other types of fires. Corps artillery units were often tasked to assist in close support. Actual divisional artillery basic loads from the war reflect the close support priority. Fifty percent of all ammunition fired was high explosive, point detonating, which was the multi-purpose round of the day. Thirty-five per cent was high explosive with time fuze, which in World War II was most often fired at exposed infantry in close support. A full fifteen per cent of artillery ammunition was smoke rounds, again almost exclusively a close support round.<29 The artillery was a great killer on the battlefield of World War II. But in the vicinity of the close-in battle, it performed another and perhaps more important function -- to restrict enemy fires and observation so that the maneuver arms could close and apply the final blow.

After World War II the organization and doctrine of divisions

changed very little before the outbreak of hostilities in Korea. One interesting change, however, that occurred in the infantry division is very instructive about the maneuver perspective on close support. The organic cannon company of six 105mm howitzers was dropped from infantry regiment tables of organization and equipment. Jonathan House suggests that the cannon company "disappeared" because it was not wanted.<30 This assessment is not borne out by record of the General Officer Review Boards that met in 1945-46 to examine divisional organizations. The mission of the cannon company as described by the Board meeting in Europe in the fall of 1945 was "to provide CLOSE and CONTINUOUS support to the infantry regiment." (Emphasis mine) In relation to mortar support, the Board found that "while the mortar is an excellent weapon, it is not a satisfactory substitute for the supporting infantry cannon."<31 Kent R. Greenfield stated that the cannon company had originally been provided to obtain fire support "before it could be obtained from the artillery."<32 The Board discussions validated this need for responsiveness, and emphasized that the cannon company filled the gap for speed when communications was lost with divisional artillery. On a vote, the board strongly recommended keeping the cannon company. It also urged that in order to provide continuous as well as responsive support, a second 155mm battalion be added to divisional artillery. These changes would mean that an infantry division would have three cannon companies, three battalions of 105mm howitzers, and two battalions of 155mm howitzers -- all geared primarily toward close support. Most likely these recommendations

were the victim of the drastic force reductions following the war's end. When the Korean War broke out in 1950, all divisional artilleries had been standardized at three battalions of 105mm and one battalion of 155.

While many conditions of combat differed in Korea from what we can expect today in Europe, one very frequent type of tactical deployment and its resulting action will be similar -- the dispersed strongpoint. House points out that this type of tactic has become increasingly common since 1945 because of the lethality of weapons, but in Korea it occurred because of the infiltration tactics and numerical strength of the enemy.<33 House says that this type of deployment requires excellent fire support and active patrolling. In Korea, American defenders began to rely on firepower to defeat sudden attacks at close range. The best example is the Chinese attack on the "No Name Line" in May of 1951. American infantrymen in bunkers with overhead cover called in tons of artillery on their own positions. One field artillery battalion fired 10,000 rounds in six hours.<34 Some strongpoints periodically received the artillery of an entire corps firing such close support fires. In Korea, firepower dominated the tactical battle, but it did so at close range. Techniques for firing close were finely honed -- often rounds were adjusted to within 50 meters of friendly positions. Mortars provided responsive and continuous fires because they were organic, but they were ill-suited to the types of massive and very close fires needed.<35

General Almond, X Corps Commander, explained after the war how

infantry battalions were sometimes extracted from encirclements using a "box barrage." Often units were suddenly attacked from three sides, and upon withdrawing would find a blocking position to their rear. Artillery fire would be brought down on all four sides of the withdrawing unit, then lifted on one side at precisely the right moment for a breakout attempt.<36 Artillery firing this type of precision close support thus effectively aided the maneuver arms.

During the war in Korea, a great dispute arose over close air support. Close air support had been used effectively in World War II, but really came into its own in Korea. Maneuver commanders preferred to have such support in combination with field artillery whenever possible because of the immense psychological effect on both friendly and enemy troops. The Army, reflecting the desire for responsiveness, argued for control of some air assets for close support purposes. The Air Force successfully fought off this challenge to its control of all air assets, but was forced to reorient thinking on close support, at least for the duration of the Korean War. Close air support had been the last in their priority of doctrine and force development, but in Korea it became one of the highest priority missions flown. One out of every three fighter sorties was flown in close support of units in contact.<37 Again, close support here means influencing the action directly in front of and in response to the immediate needs of committed units.

In Vietnam, tactical dispersal became even more necessary than in Korea because of the guerrilla nature of the enemy. Units were widely dispersed and very often isolated from mutually supporting maneuver units. In addition, Vietnam demonstrated a new degree of fluidity that begins to approach the present-day European battlefield in the large scale use of airmobile forces. For example, in the Battle for LZ X-Ray, the 1st Battalion 7th Cavalry conducted an airmobile operation and landed right in the middle of a North Vietnamese Army division. Two batteries of artillery, flown in at the same time, had taken up positions about eight kilometers away. As the 1st of the 7th suffered determined attacks from all sides, forward observers called for close-in artillery and air support. The two 105mm artillery batteries responded by firing over 4000 rounds throughout the night, so close that "troops felt hot shell fragments whistle over their heads." Air force aircraft orbited on station for over forty hours, attacking a target every fifteen minutes. The survival of elements of the 1st of the 7th CAV is attributed to the close support that it received.<sup>38</sup> This example illustrates the special fire support requirements of dispersed and fluid operations. Close air support and close support artillery became an effective tactical team in meeting such requirements.

The 2d Battalion 28th Infantry found itself in a situation similar to that of the 7th Cavalry when it was attacked in a night perimeter by a Viet Cong regiment in 1966. Attacks came from several directions, but the battalion commander had previously

planned coordinated artillery and air support all around his perimeter. On three sides the attacks were met with massed artillery, which was walked back and forth across the attacking enemy. The fourth side of the perimeter was given to the air force to facilitate airspace coordination. Tactical aircraft brought in napalm as close as fifty meters. Major Harry Rhinehart, an infantryman who analyzed this battle, saw the primary lesson as the enhancement of success by the use of close and continuous artillery support.<39

For our purposes, Korea and Vietnam were significantly different from a modern European war, but manifested a few important similarities. They demonstrated that dispersed and isolated forces must have even more responsive and continuous close support than ever before. In this regard, the attachment of a three battalion group to support CCB, 7th Armored Division carries a logic similar to the support of the 1st Battalion 7th Cavalry with two dedicated batteries and close air support. Close support over such wide areas, as seen in Vietnam, may preclude the ability to mass large numbers of artillery units, as was done in Korea. In that case, all available close support means must be integrated into a coordinated plan of fire support. Certainly close air support has become more important than ever, and fire support coordinators can neglect mortars no longer. The British discovered the same lessons in the Falklands, and also made effective use of naval gunfire. In several instances, British units found themselves pinned down by enemy less than fifty meters

away, and had no choice but to bring artillery in that close to enable the troops to get up and move again.<40 In Europe the air force will have an air superiority battle to fight that it did not have in Vietnam. Consequently we will not see the same air force dedication to close support. It becomes more clear that the artillery will have to take up much of the slack by not only being responsive, but also firing continuously until close support needs have been met. The need for continuous fire means that supporting artillery must have the same mobility as the units it supports. In Vietnam, U.S. artillery achieved the needed mobility by developing such techniques as the use of heavy lift helicopters to move artillery to stay in supporting range of maneuver.<41 The need for continuous fire also means that gunners must examine their basic loads and logistical support concepts to make sure they have ammunition adequate for the close support task.

The modern battlefield, however, will not only be more fluid, it will be extremely lethal. Both NATO and Warsaw Pact forces are highly mechanized, and infantry fighting vehicles now possess deadly, tank-killing weapons. Engagement ranges for anti-tank guided munitions and tank guns are in excess of 3000 meters with a clear line of sight. New surface-to-air missiles and antiaircraft gun systems, particularly near the forward line of troops and around important command, control, and logistics complexes, have made the airspace a very hazardous place. Soviet artillery retains its traditional high place in maneuver doctrine and in procurement of hardware. Half of all Soviet artillery tubes,

about 17,000, are deployed opposite European NATO. Recent deployments of self-propelled guns and newer types of ammunition give Soviet artillery a range and lethality far beyond their significant World War II capabilities.<42 All of these developments have implications for close fire support on the modern battlefield that we must consider. For this reason, we can look to the Arab-Israeli War of 1973, and specifically to the Suez Front, for historical data on the battlefield effects of such conditions of lethality. The rival armies along the Suez canal possessed the latest weapons systems available, both Soviet and western. The Israelis, as U.S. forces would be in Europe, were outnumbered in warplanes, tanks, and artillery pieces by a ratio of more than three to one. When war broke out, the Israelis were caught by surprise, another possible condition in Europe, which created a number of problems which degraded the coordination of fire support. And although the Israelis eventually overcame all of their difficulties and won the war, in the initial stages they fought a series of bitter division, brigade, and battalion actions in which they suffered heavy, and perhaps unnecessary losses. In this case the lessons are negative ones, for it was the lack of coordinated and sufficient close support which cost the Israelis so dearly.<43

The lack of Israeli fire support initially has been generally acknowledged to have been a serious error in pre-war doctrine and preparations for war. The essential error was that Israeli tacticians had overemphasized tanks at the expense of a more



balanced combined arms approach to combat. Field artillery doctrine, as will be explained below, was also inadequate for the close support tasks required. The employment of the Adan Division to counterattack the Egyptian 2d Army bridgehead on 8 October 1973 provides the clearest example of what can happen at the tactical level on the modern, lethal battlefield when close support is inadequate. The plan was for Major General "Bren" Adan to attack a series of Egyptian 2d Army positions about four kilometers east of the Suez Canal. He intended to hit them on the flank from north to south. Normally, the Israeli Air Force would have provided massive close air support, as it had done in 1967, and a field artillery brigade, organic to the division, would have provided centralized fire in order to mass on enemy tank formations. Such a method of artillery command and control reflected the Israeli fixation on the idea that the best employment of any weapon on the battlefield was to kill tanks. Massing artillery was the only way for artillery to effectively kill tanks, hence the centralized control.<44 In reality, the Israeli Air Force was busy fighting an air-to-air war, which it did not have to fight in 1967, and was unavailable in the initial stages of the fighting. The field artillery had been relatively neglected in peacetime under the assumption that the "flying artillery" would be there. The result of these errors was a series of brigade and battalion attacks that lacked any substantial fire support at all.<45 Only two batteries of artillery were available to support Adan's two brigade attack. Herzog described the attacks as "old fashioned cavalry charges",

which ended in complete failure. The Egyptians were dug in with large numbers of Sagger anti-tank guided missiles and rocket propelled grenades. In one of the Israeli brigades, one battalion lost 18 of 25 tanks, the other 15 of 25. Out of around 100 tanks committed, 70 were hit.<46 The Adan Division ended the day of 8 October withdrawing and fighting off Egyptian counterattacks.<47 The day's attack, in other words, bordered on disaster.

One of the reasons for the Israelis' ultimate success was their ability to recover from and correct mistakes during the fighting. By 12 October, they were deploying artillery brigades to their divisions, this time with the principal mission of neutralizing anti-tank missiles and gun positions in support of friendly armor.<48 As units moved, their artillery displaced with them. Other stationary brigades covered the movement. Commanders found that massed 155mm fire was still effective in halting and disabling tanks, but that such centralized mass firing was not the optimum for close support. It became evident that the artillery's best role in close support was to suppress Saggars and anti-tank guns, and screen friendly movements with smoke. When the artillery assisted in thwarting the enemy's ability to observe and fire, Israeli armor accomplished great things both tactically and operationally.<49

The Israelis discovered a similar need for the suppression of enemy air defenses. New and highly effective surface-to-air missiles and the deadly ZSU 23-4 took a heavy toll whenever

Israeli aircraft attempted to provide close air support.<50 While suppression of enemy air defenses is not a new close support task, its importance on the modern battlefield is highlighted by the Israeli experience and by the proliferation of helicopters in U.S. Army divisions. The need for coordinated and continuous suppression of enemy air defenses will be a significant demand on close support artillery.

In sum, we have seen that on a non-linear and fluid battlefield, units often become isolated and find themselves faced with superior numbers. In such instances, responsive and continuous fire from all available fire support means is a must. In the final analysis, aircraft belong to the air force and may not be there at the critical moment. Mortars are fine close support weapons, but their utility comes mostly from their responsiveness, not their firepower. Mortars can provide neither the volume of firepower nor the accuracy of field artillery fires in close support.<51 As Colonel W.F. Millice wrote in 1943, "tankers...cannot dig foxholes -- when they need help, they need it now and in volume, not next week in small quantities."<52 Artillery is and will be the heart of close support, and it must be responsive and continuous with its fires. It will also have to routinely bring rounds within a hairsbreadth of friendly troops, protecting them and shaping their battle. It must do this with finesse, as part of a combined arms, synchronized operation. Massed artillery is a proven killer, but on the Airland Battlefield of the 1980's, smoke and suppression will be an

extremely important contribution of the guns. Such a capability will assist the armor and infantry to maneuver on the battlefield, a necessity for a heavily outnumbered force if it hopes to win.

#### THE U.S. ARMY FIELD ARTILLERY AND CLOSE SUPPORT

To this point, we have concentrated on establishing the close support demands of the modern battlefield. The question remains, can the U.S. Army field artillery meet these demands? Space does not permit a rigorous analysis of this question. Instead, we will take the grand jury approach -- is there sufficient evidence that something is lacking to warrant a more in depth investigation? To answer this question, we will take the findings of the last section and look at the artillery's structure for close support, that is, its organization, its tools, and its doctrine.

Organizationally, U.S. field artillery seems to be returning somewhat to the use of functional headquarters as it did in World War II. In that war, corps artillery most often performed the functions of counterfire, harassment and interdiction. To do this it retained some corps battalions, usually the heavier guns, under its control, and assigned or attached others to subordinate division artilleries. Thus supplemented, the division artilleries concentrated, as outlined above, on the close support requirements of the maneuver units. After the Korean War, corps artilleries were deactivated, and a corps artillery section performed fire support coordination for the corps. Corps artillery units were

organized into field artillery groups, which would then be suballocated to division artilleries or retained under corps control. The division artilleries picked up the counterfire mission and much of the responsibility for harassment and interdiction. With recent army-wide reorganization of the Army of Excellence, the corps artillery headquarters was reestablished. But the more complicated battlefield of today points to a corps artillery that focuses primarily on corps deep operations rather than taking functions off the shoulders of division artillery. The division artillery retains the counterfire mission, as well as the shorter range interdiction which comprises the division's deep operations. Division artillery will also have to suppress enemy air defenses in support of division combat aviation units and tactical aircraft. All of these functions, of course, compete for division artillery assets which would otherwise fire the close support mission. Arguably, some of these tasks, such as counterfire, are part of close support. But from a maneuver perspective, there is a fine line between counterfire and counter-counterfire, that is, from keeping artillery off the backs of maneuver to fighting a gunner's duel. The focus, then, on the close support mission comes only at the direct support battalion level. Even though this unit theoretically answers calls for fire in first priority from its supported unit, its command relationship rests with division artillery headquarters, not with the supported brigade. There exists, then, the potential that the direct support battalion may find its fires being used for other missions besides close support, particularly in light of the above

mentioned demands on division artillery assets.

Unfortunately, ideas about command and control of artillery suggest that this potential may become more than that. The trend in artillery command and control is toward increased centralization. Centralization versus decentralization has been a perennial debate which we cannot take up here. But the problem for close support is the idea behind the current trend -- that artillery must mass in order to kill people and things on the battlefield. This idea, as seen in the debate prior to and during World War II on the use of airpower for an independent mission, begins to take on a life of its own, and soon the artillery, or the air force, or any organization that centralizes, begins to focus on the idea of attrition rather than maneuver. The U.S. Army Air Corps demonstrated its belief in attrition with its emphasis on centralized control and strategic bombing in World War II. Centralizing trends in the field artillery also point toward an attrition style of war.

With the fielding of the TACFIRE command and control system, the artillery in general has bought heavily into the idea of killing things through centralized control of artillery. In itself, such a capability enhances the division commander's ability to influence his battle, but if the battle is to be won within the 300 meter line, the price of this capability may be too great to pay. What is suggested here is that our organizational ideas may be detrimental to the close battle in general, and

artillery close support in particular. The idea that division artillery headquarters must coordinate the functions of counterfire, suppression of enemy air defenses, and attack of deep targets, IN ADDITION to close support, means that the attention given to close support is diluted. The performance of artillery battalions at the National Training Center generally has been poor. Since what we see at the NTC is essentially the close support scenario, these results may indicate a lack of focus on the close support demands on field artillery.<53 Further, the idea that artillery employed en mass is most effective, while true, has diverted focus from supporting troops in contact to the attack of "high-payoff targets." The Israelis discovered at a great price the error of neglecting close support artillery on October 8, 1973. Finally, the idea that the artillery can be more effectively used if centrally controlled is extremely strong. The mere presence of TACFIRE tempts centralization of all available artillery when a high-payoff target appears. No one can deny that massed artillery is to be desired, but many artillerymen think that ALL artillery should be on call to a central commander, that in a defensive situation division artillery should be the "agile, massive linebacker."<54 They have taken their eyes off the close battle and its centrality. TACFIRE gives the division artillery headquarters the ability to control centrally all artillery fires, yet its functions are many, and at any time any function could seem desperately important. On the modern battlefield, however, there will be a need for immediate, continuous and reliable close support. Such a complex and technical system of fire control

invites the problems of inevitable friction. But even if the system is working perfectly, TACFIRE has not proven itself capable of providing the type of responsiveness needed by the unit in contact.<55

The tools available to the heavy division for the close support mission seem at first to be awesome enough. The J-series division artillery consists of three 155mm self-propelled howitzer battalions, and one Multiple Launch Rocket System (MLRS) battery of nine launchers, each with the firepower equivalent of two to three battalions of 155mm guns.<56 A heavy corps artillery would probably have three to four field artillery brigade headquarters, six battalions each of 203mm and 155mm self-propelled howitzers, and three or four MLRS battalions.<57 Typically, a division in a defensive main effort would have a field artillery brigade attached or in a reinforcing role, with a battalion each of 203mm and 155mm and an MLRS battalion.<58 The field artillery brigade headquarters could perform a function such as coordination of division deep battle, or it could simply support the division artillery as an alternate tactical operations center. The MLRS can support the division with counterfire, suppression, interdiction, and other general support missions, but it cannot provide close support to units in contact.<59 Let us assume that the significant firepower of thirty-six MLRS launchers would be able to take care of the division deep operations, counterfire, and some of the suppression of enemy air defenses.<60 The division would have, then, about five cannon battalions, including



some 203mm from corps, to fire in close support, or about the same as the 7th Armored Division at St. Vith. The division frontage has doubled since 1944 to about 60 kilometers, but ranges of artillery weapons have not.<61 Consequently the today's division will have fewer firing units available to it than in World War II.

More significant is the focus of systems providing general support to divisional artillery. In World War II and in Korea, we saw that divisional general support weapons, the 155mm battalions, were routinely assigned missions to reinforce close support fires. Corps artillery, which had the counterfire, interdiction and air defense suppression missions, often focused a number of its assets downward on the close support mission. Today, on the other hand, the view is upward, away from close support. The division general support weapon, the MLRS, is incapable of close support. It will fire primarily counterfire, interdiction, and SEAD missions. The units of supporting field artillery brigades will reinforce close support fires as discussed above, but they lack a habitual focus on the close support mission, which diffuses peacetime efforts to prepare for the close battle.

Another problem of tools adds evidence to the idea that there is a lack of focus within the field artillery community on close support. We saw in earlier wars that the general purpose round was the rather unsophisticated high explosive round with point detonating fuze. Today, FM 6-20 recommends a basic load of approximately 53% dual-purpose improved conventional munitions,

19% field artillery scatterable mines, 10% rocket assisted projectiles, and 3% Copperhead rounds. All of these rounds are best used at longer ranges. High explosive and smoke, the best close support rounds are recommended to make up only 10% and 3 % respectively. 62 Thus DPICM is the recommended multi-purpose round for today's artillery. Yet this round, because of its widespread dispersal of lethal sub-munitions, is ill-suited to the precise requirements of close support outlined above. Not only is the DPICM round inappropriate for close support, its "dual-purpose" is to kill tanks and personnel, that is, it orients on killing things, and not on supporting a specific maneuver perspective of what fire support is needed where. DPICM is an important new development in U.S. firepower -- we must take advantage of it. But it is not a close support round, and for artillery doctrine to recommend that it make up close to 60% of 155mm basic loads reflects a lack of focus on close support at the tactical level. Further, our present thermal sights give us an advantage over the Warsaw Pact forces in limited visibility conditions. This fact and the results of the Arab-Israeli War of 1973 suggest that much more smoke, not much less, will be required today than in World War II. Then the American army carried 15% smoke. Today we are advised to carry 3%.

A final difficulty exists in the mobility of the guns. We made the point earlier that in order to provide effective close support, the guns must be at least as mobile as the supported maneuver arm. The lessons of history are clear on this point:

the failure of artillery to advance with attacking troops was a fundamental reason for the superiority of the defense in World War I. It also explains the use of assault guns by most armies of World War II. We saw how the U.S. Army solved its mobility problem in Vietnam by the use of heavy lift helicopters. A greater problem exists in today's heavy divisions, which are being equipped with the highly mobile M1 Abrams tank and the M2 Bradley fighting vehicle. The M109 series and the M110 series howitzers remain the supporting artillery pieces. Conscious decisions have been made to product improve them rather than develop more mobile guns. These vehicles will not be able to keep up with M1's and M2's, thus maneuver units at critical moments may have to slow down or do without artillery support.

Of course, one can argue that there is no problem, since ammunition, guns, and other tools can be adjusted at will. An examination of actual basic loads will reveal that this is true. Many units have more high explosive rounds in their basic loads than FM 6-20 recommends. This may or may not reflect practical thinking in the field. Very possibly, it simply reflects that at the present time much more high explosive is available in the supply system than DPICM. The point is, however, that the RECOMMENDED disposition of ammunition, and actual tables of organization and equipment indicate a lack of focus on the close-in battle at the very center of the field artillery community. Recent doctrinal developments and expressed orientations within the field artillery reveal the place of close

support within the queue of artillery tasks. The artillery branch has responded to its difficulties at the National Training Center by attempting to develop a more accurate system for assessing casualties and damage on the battlefield.<63 They have also conducted a series of Close Support Studies, which, unfortunately look only at the fire support coordination piece of the fire support system.<64

Meanwhile, behind these piecemeal efforts at solving very grave problems, the artillery branch has "led the way" for other branches in conducting a functional area analysis to determine its optimum role on the modern battlefield and thus plot a course for the future.<65 It is clear that the Fire Support Mission Area Analysis is the driving force behind combat developments in the field artillery, to include mission, doctrine, and hardware.<66 It is equally clear that the FSMAA view of artillery's role has taken field artillery eyes off the close-in battle, saying that the relative advantage of our combined arms team lies in the "over-the-hill battle."<67 It further states that "...given our (that is to say, the combined arms team's) current focus on the close-in battle, at best we can only avert defeat.<68 These statements not only reflect current attitudes within the combat developments community at Ft. Sill, they indicate the direction that several years of TACFIRE, improved munitions, and terminal homing munitions research has taken the field artillery branch. Certainly, we must take advantage of our technological superiority. But we must never make the mistake of thinking that

weapons and technology finish the fight. If we assume that today's battle can be won over the hill, then we do so at our grave peril. It is the same mistake that airpower enthusiasts made between the two world wars.

#### CONCLUSION

We have discovered that the close support demands on the modern, fluid, and highly lethal battlefield will be greater than ever. Maneuver units will need fires delivered with immediate responsiveness and delivered continuously until the threat to that unit's integrity abates. Units will need these fires delivered with professional finesse and precision, as part of an overall integrated scheme of maneuver. Often, these fires will have to cut with the precision of a surgeon, separating bad from good by a thin red line. Other times, maneuver must move quickly and with freedom, and the artillery must make the path safe by quick, precise suppression and obscuration. Artillerymen today must have more skills than ever before, and they must focus their energies, their priorities, and their resources appropriately.

If the battle is to be won within the 300 meter line, and no one has proven that it will not be, then it is clear where the priority must be. Unfortunately, the U.S. Army Artillery has cast its gaze over the hill. This is reflected in how artillery units are organized and how they are equipped. Perhaps more seriously, the artilleryman's gaze over the hill is reflected in how many of them think. Ominously, we seem to see the clouds of the great

air-ground debate enter the ranks of the army once again. Air and artillery missions are innocently described with similar terms: counterair-counterfire; air interdiction-interdiction fires; close air support-close support; air recce-target acquisition.

Today, we are seeing even more precise parallels: allocation of sorties-allocation of fires; targeting-target value analysis; and others. Armies all over the world have discovered that close air support is great when it is there. Many, such as the Germans in late World War II and the Israelis in 1973, have discovered what happens when it is not and there is no backup. We in the United States Army must not discover on a bloody battlefield that our artillery was unavailable or incapable of providing close support when we needed it. The great value of the National Training Center is that we can discover and correct problems while firing blank ammunition. It has no value, however, if we attempt to explain away our difficulties as "inaccuracies of the system" and go on about our business as usual. We must subject ourselves to ruthless self-examination, and swim against the tide even if we have expended much of our energy and resources getting to where we are in field artillery combat developments.

Artillerymen should have the attitude of the great World War II 9th Air Force Commander, Major General Elwood P. "Pete" Quesada:

Close-in air ground cooperation is the difficult thing, the vital thing. The other stuff is easy.<69

We must continue to develop our capabilities to attack over the hill. But we should make it our real challenge, and the focus of our minds and hearts, not to mention our resources, to dominate the area about a stone's throw in front of Private Jones' foxhole. Our maneuver brethren must look the enemy in the eye and defeat him. The artillery must help make that happen. The other stuff is easy.

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<2 David Chandler, THE CAMPAIGNS OF NAPOLEON (New York, 1966), p. 356.

<3 FM 100-5 (Draft), July 1985, p. 2-18.

<4 FM 6-20, 31 December 1984, p. 1-16.

<5 P.H. Vigor, SOVIET BLITZKRIEG THEORY (New York: 1983), Chapter 1.

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<7 Vigor, OP. CIT., Chapter 1.

<8 IBID., p. 1.

<9 See note 6.

<10 All figures from FM 100-2-3, 16 July 1984.

<11 FM 100-2-1, 16 July 1984, pp. 4-6 through 4-9.

<12 General Kroesen quoted by John English in "Thinking About Light Infantry," INFANTRY, Vol. 74, No. 6 (Nov.-Dec. 84), p. 24.

<13 FC 71-100, 7 June 84, p. 4-46.

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<36 Scales, p. 20.

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<47 Herzog, OP. CIT., p. 254.

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<49 Gay, p. 140.

<50 Frank Aker, OCTOBER 1973: THE ARAB-ISRAELI WAR (Hamden, CT: 1985), pp. 24-25.

<51 J.W. Ryan, GUNS, MORTARS, AND ROCKETS (New York, 1982), p. 37.

<52 Colonel W. F. Millice, "If Ordered to the Armored Force," FIELD ARTILLERY JOURNAL, Vol 33, no. 5 (March 1943), p. 341.

<53 Poor performance of artillery at the NTC was assessed by the NTC Tradoc Commander, Colonel Wes Clark, in a discussion with SAMS students at Ft. Leavenworth, 5 September 1985. The same assessment can be seen in any number of after-action reports from unit cycles.

<54 The clearest statement of the idea that ALL artillery should be centralized can be found in William R. Calhoun's article, "Let's Take Another Look...GS in the Defense," FIELD ARTILLERY JOURNAL, (Sep-Oct 1977), pp. 40-43. He unashamedly states that dispersing artillery out to supported brigades is a dispersal of firepower and should not be done. Instead, all divisional artillery should be in general support of the division. While the idea of mass on mass has been discredited along with the Active Defense, a lot of residual active defense thinking finds strong refuge in the field artillery community.

<55 Artillerymen acknowledge that TACFIRE does not have the capability to discriminate between priority missions when targets are dense. Unfortunately, all visions of the next battlefield predict a "target-rich environment." See LTC Robert Zawilski, "A Redleg Potpourri," FIELD ARTILLERY JOURNAL, Vol. 53, No. 5 (Sep-Oct 85), p. 9. The TACFIRE discrimination problem is a serious indictment against the field artillery's capability to provide close support, since a prime requirement of close support is responsiveness. Even without this systemic problem however, TACFIRE performance at the NTC has been poor, and may in fact be a prime culprit in the problems experienced by artillery units there. The fielding of the Advanced Field Artillery Tactical Data System (AFATDS) may solve some of the systemic problems, but exacerbate the shaky foundational idea of centralized control

of all, including close support, artillery.

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<57 ST 101-1, p. 9-16.

<58 IBID.

<59 FC 6-60-20, 1985, p. 1-1. The minimum planning range for the MLRS is eleven kilometers. p. 1-5. The rocket warhead is an ICM-type round which disperses 644 submunitions over a wide area. FM 6-60 states categorically that direct support is not an appropriate mission for MLRS because "MLRS fires lack the precision accuracy necessary for direct support. FM 6-60, p. 3-12.

<60 This is not at all certain. The Soviets have recently developed and deployed a new generation of rocket launcher, the BM-27, with characteristics similar to the MLRS. They have deployed their systems, as usual, in great numbers. Soviet artillery capabilities are greater than ever before, and could be too much for MLRS to handle alone. There will also be logistics considerations which will preclude overuse of the MLRS.

<61 The standard direct support weapon in an armored division of World War II was the M7, 105mm howitzer, with a maximum range of 12, 205 yards or 12, 090 meters. Today the standard piece is the M109A3, 155mm howitzer with a standard munition range of 18,100, or a 49% increase over its World War II counterpart. General support, in terms of reinforcing close support fires, was provided by the M1, 155mm howitzer, with a range of 16, 355 yards or 16, 200 meters. Today, such fire could only be provided by the M110A3, 203mm howitzer with a standard munition range of 23, 000 meters, an increase of 42% since World War II. Rocket assisted projectiles can extend these ranges, but such rounds will probably not be present in the quantities needed for close support. Also, close support accuracy demands that supporting artillery not be firing at maximum ranges.

<62 FM 6-20, 28 January 1983, p. H-14.

<63 Brigadier General Raphael Hallada, in a discussion with artillerymen at Ft. Leavenworth in September 1985, explained a new system being developed at Ft. Sill to more accurately assess the effects of artillery on the NTC battlefield. The system will consist of a network of sensors and transmitters dispersed over the battlefield and linked with individuals by equipping each man with a cigarette pack-size sensing device that beeps when he has been hit.

<64 See Close Support Study Group Reports, I, II, and III.

<65 In a telephone interview on 18 September, an officer of the Directorate of Combat Developments, U.S. Army Field Artillery School, Ft. Sill, Oklahoma, stated that the development of the Functional Area Concept had been a great accomplishment for the field artillery branch, which places it on a "co-equal" footing with other combat arms. Out of this concept comes the Field Artillery Azimuth, which outlines the course for fire support through Airland Battle to Army 21. DCD is currently engaged in research to redefine the mission of the field artillery, considered obsolete

based on new capabilities for the delivery of fire. DCD states that the priorities for doctrine and hardware development will be on the synchronization of fires and on the ability to defeat high-payoff targets.

<66 The document itself makes this clear: "The Fire Support Mission Area Analysis is the heart of the field artillery combat developments system." U.S. Army Field Artillery School, "Fire Support Mission Area Analysis," Phase II (Level I), Vol. II, 15 December 1980, p. 14-5.

<67 IBID., p. 14-22.

<68 IBID.

<69 Scales, p. 17.

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